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XXVIII.—A HOST LIST OF THE POLYPOREAE
OCCURRING IN THE UNION OF SOUTH AFRICA.

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INTRODUCTION.

The *Polyporeae* are of considerable economic importance to all concerned either with the care of forests or with the timber trade. Several parasitic and semiparasitic species are responsible for the decay of valuable timber trees, and even those which are purely saprophytic often cause serious loss by inducing the decay of sleepers and posts.

Several of the species of *Polyporeae* are of wide distribution, and one object in publishing this list is to add to our knowledge of the hosts on which they occur.

In taking up the study of these fungi and of the damage they cause it was essential to have them correctly identified, and in this connection I am indebted to Mr. C. G. Lloyd for much kind assistance.

When I started on the subject some five years ago the number of species to be found in any herbarium or mycological institution in South Africa was small, and these were not determined with any degree of certainty. With the cooperation of friends and especially officers of the Forestry Department, who collected for me in various parts of the Union, our knowledge of the species of *Polyporeae* occurring in the Union has been considerably increased. Mr. J. D. Keet, of the Forestry Department, took an especial keen interest in the subject, first in the King William's Town conservancy and subsequently in the Knysna conservancy, and we are indebted to him for bringing to light a large number of species not previously recorded from the Union.

With regard to the arrangement adopted in this paper, the genera are listed alphabetically and the species alphabetically under their respective genera. The genus *Polystictus* is merged in the genus *Polyporus*. The host-plants are listed alphabetically under the various species. Where no name is given the host-plant was undetermined.

The list contains a few species believed to be new and indicated accordingly. These will be described in a monograph of the South African species to be published later.

In most of the countries where forestry plays an important part ever-increasing attention is being devoted to the causes of the decay of trees and timber for which this group of fungi is largely responsible. A knowledge of their distribution over the globe is for this reason very desirable, and it is hoped that the present list, the first from the Union, will supplement those which have already appeared from America, Ceylon, and other countries.

Daedalea (Pers.) Fr.

- D. fuscospora**, Lloyd. Old rotten log.
D. Hobbsii, n. sp. (MS. name). Old log.

Favolus, Fr.

Species of this genus were only found on dead logs. The genus appears to occur only in the more subtropical parts of the Union.

- F. brasiliensis**, Fr.
F. dermoporus (Pers.) Lloyd.
F. europaeus, Fr.
F. Jacobaeus, Sacc. et Berl. This is the same as *F. brasiliensis* but with slightly smaller pores. In one collection the surface of the pileus was slightly tessellate and thus tended to connect this species with *F. tessellatus*, Mont.
F. megaloporus (Mont.) Bres.
F. spathulatus (Jungk.) Bres.

Fomes (Fr.) Gill.

- F. applanatus** (Pers.) Gill. On *Acacia mollissima*, *Celtis kraussiana*, *Cunonia capensis*, *Curtisia faginea*, *Olea laurifolia*, *Podocarpus* sp., *Pyrus communis*, *Rhus laevigata*, *Trichocladus* sp. Under *F. applanatus* I include *F. annularis*, Lloyd, *F. leucophaeus* (Mont.) Cooke, *F. vegetus* (Fr.) Cooke, *F. australis* (Fr.) Cooke.

In the "South African Journal of Science," Vol. xiv., p. 465, a rot of *Olea laurifolia* caused by this fungus was described.

- F. conchatus** (Pers.) Gill. On living *Melia Azedarach*. Also saprophytic on various undetermined logs and stumps.
- F. connatus** (Weinm.) Gill. On living *Curtisea faginea*.
- F. geotropus** Cooke. On living plants of *Ocotea bullata*, *Podocarpus* sp., and *Virgilia capensis*.
- Fomes hornodermus** (Mont.) Cooke. On *Ocotea bullata*.
- F. McGregori**, Bres. On *Rhus laevigata*, *Scolopia Mundtii*, and *Trichocladus* sp.
- F. melanoporus** (Mont.) Cooke. On undetermined logs.
- F. oroflavus**, Lloyd. On *Podocarpus* sp.
- F. pectinatus** (Kl.) Gill. On *Acacia melanoxydon*, and *Kiggelaria africana*.
- F. rimosus** (Berk.) Cooke. On living plants of *Acacia* sp., *Curtisea faginea*, *Elaeodendron croceum*, *Kiggelaria africana*, *Olea laurifolia*, *Pleurostyla* sp., *Ptaeroxylon utile*, *Rhus laevigata*, *Schotia latifolia*, *Scolopia Mundtii*, *Xymalos monospora*.
- In Trans. Roy. Soc. South Africa, Vol. vi., p. 215, the "Heart Rot" of *Ptaeroxylon utile* caused by this fungus is described.
- F. Robinsoniae** (Murr.) Sacc. et Trott. On *Gymnosporia peduncularis*.
- F. robustus**, Karst. On *Olea laurifolia*, *Xymalos monospora*.
- F. senex** (Nees et Mont.) Cooke. On living *Sisymbrium* sp., and other undetermined hosts.
- F. yucatanensis** (Murr.) Sacc. et D. Sacc. On living plants of *Olea* sp. and *Trema bracteolata*.

Gloeoporus, Mont.

- G. conchoides**, Mont. Saprophytic. Host undetermined.

Hexagonia, Fr.

In South Africa the genus *Hexagonia* occurs only in the more subtropical regions.

- H. albida**, Berk.
- H. Dybowskii**, Pat.
- H. phaeopora**, Pat.
- H. Pobeguini**, Har.
- H. rigida**, Berk. On *Persea gratissima* (dead branches). Also saprophytic on other undetermined hosts.
- H. speciosa**, Fr. Saprophytic on old logs in the forests of Zululand.

- H. tenuis** (Hook.) Fr. Saprophytic on *Albizzia fastigiata*, *Hibiscus tiliaceus*, *Xanthoxylon capense*.

The form known as *H. tricolor*, Fr. is referred to *H. tenuis*, as the stain present on the upper surface of the pileus is not constant.

Laschia, Fr.

- L. Thwaitesii**, B. et Br. On dead branches lying on the ground in forests.

Lenzites, Fr.

- L. aspera** (Kl.) Fr. On *Eucalyptus globulus*.

- L. betulina** (Linn.) Fr. (including *L. guineensis*, Fr.) A common saprophyte. Recorded on *Acacia mollissima*, living *Celtis kraussiana*, *Olea laurifolia*, *Pinus* sp., *Quercus* sp.

- L. repanda** (Pers.) Fr. A common saprophyte. Recorded on *Acacia mollissima*, *Salix* sp., and undetermined hosts.

Under *L. repanda* are included *Daedalea elegans*, Spreng. and *Lenzites appplanata*, Fr.

- L. trabea** (Pers.) Fr. On logs of *Pinus* sp., *Populus* sp.

Polyporus (Mich.) Fr.

- P. adustus** (Willd.) Fr. On *Quercus* sp. (Saprophytic on logs and stumps.)

- P. anebus**, Berk.

- P. aratus**, Berk. (= *P. luteo-olivaceus*, Berk.) a common saprophyte.

- P. arcularius** (Batsch) Fr.

- P. arenosobasus**, Lloyd. On the ground.

- P. biformis**, Kl.

- P. cinnabarinus** (Jacq.) Fr.

- P. Colossus**, Fr.

- P. conchatus**, Lloyd. On dead stump of *Populus* sp.

- P. dichrous**, Fr., Saprophytic on *Podocarpus* sp. and *Rhus laevigata*.

- P. dictyopus**, Mont.

- P. durbanensis**, n.sp. (MS. name).

- P. Emerici**, Berk.

- P. flexilis**, n.sp. (MS. name).

- P. fruticum**, Berk. et Curt. On living Rubiaceae plant.

- P. gallopavonis**, Berk. et Br.

- P. gilvus** (Schw.) Fr. A common saprophyte on *Acacia melanoxylon*, *Calodendron capense*, *Rhus laevigata*, *Scolopia Mundtii*, *Quercus* sp. and other undetermined hosts.

Under *P. gilvus* I include *P. scruposus*, Fr.

P. hirsutus (Wulf.) Fr. Saprophytic on *Acacia decurrens* var. *normalis* and on undetermined hosts.

P. hirsutulus, Schw.

P. hirtellus, Fr.

P. immaculatus, Berk. Saprophytic on *Podocarpus* sp.

P. leoninus, Kl.

P. lucidus (Leys) Fr. On living plants of *Acacia* sp., *Acacia mollissima*, *Albizzia amara*, *Albizzia fastigiata*, *Olea laurifolia*, *Olea verrucosa*, *Salix* sp., and on dead *Ptaeroxylon utile* and *Zizyphus mucronata*.

Under *P. lucidus* I include *Ganoderma sessile*, Murr., *P. capensis*, Lloyd, and *Ganoderma fulvellum* Bres.

P. luteus (Bl. et Nees) Fr.

P. mastoporus, Lév.

P. mollicarnosus, Lloyd.

P. nigrolucidus, Lloyd. On the ground in forests.

P. occidentalis, Kl. A common saprophyte. Recorded on *Albizzia fastigiata*, *Persea gratissima*.

P. lanatus, Fr., *P. helvolus*, Fr. and *Trametes deveza*, Berk. are included under this name.

P. ochroleucus, Berk. On dead *Curtisea faginea* and *Trichocladus* sp.

P. ochroporus, n.sp. (MS. name). Close to *P. Patouillardii* but with different surface, larger and differently coloured pore mouths and thinner setae.

P. Patouillardii, Rick. On living *Scolopia Mundtii*;

P. phocinus, Berk. et Br.

P. pinsitus, Fr.

P. pocula (Schw.) Berk. et Curt. On bark of *Eucalyptus* sp.

P. pubescens (Schum.) Fr.

P. rusticus, Lloyd. Saprophytic on stump of *Pinus* sp.

P. sacer, Fr. On the ground in forests or in the vicinity of stumps.

P. sanguineus (Linn.) Fr. A common saprophyte. Found on living *Aloe arborescens*, *Aloe Marlothii*, as well as on dead *Acacia mollissima*, *Olea laurifolia*, *Xymalos monospora*, and undetermined hosts.

P. subpictilis, Henn.

P. subradiatus, Lloyd. Saprophytic on *Eucalyptus* sp.

P. sulphureus (Bull.) Fr. On *Quercus* sp. (wound parasite), and on *Eucalyptus* sp. (saprophytic on stump.)

P. tabacinus, Mont.

P. Trichiliae, n.sp. (MS. name). On *Trichilia emetica*.

- P. undatus**, *Pers.*
P. varius, *Fr.* On dead *Curtisea faginea*.
P. velutinus, *Fr.*
P. versicolor (*Linn.*) *Fr.* Common saprophyte on *Acacia mollissima* and various undetermined hosts. On *Prunus persica* it occurs as a wound parasite.
P. versiporus, *Pers.*
P. vinosus, *Berk.*
P. xanthopus, *Fr.*
P. zonatus, *Fr.*

Trametes, *Fr.*

- T. albotexta**, *Lloyd.* On dead *Podocarpus* sp.
T. cingulata, *Berk.* Common on dead *Acacia mollissima* and indigenous *Acacia* spp.
T. griseo-lilacina, n.sp. (MS. name).
T. Hystrix, *Cooke.*
T. incondita, *Fr.* On living *Ptaeroxylon utile*.
T. Keetii, n.sp. (MS. name).
T. lactinea, *Berk.* Saprophytic on *Acacia mollissima* and *Schotia latifolia*.
T. moesta, *Kalchbr.*
T. obstinatus, *Cooke.* Common in South Africa on living *Acacia mollissima*, indigenous *Acacia* sp., *Citrus*, and a number of undetermined hosts.
T. ochrolignea, *Lloyd.*
T. protea (*Berk.*) *Fr.* A common saprophyte on species of *Pinus*, *Populus*, *Salix*, and undetermined hosts.
T. robiniophila, *Murr.*
T. Sepium, *Berk.*
T. Sycomori, *Henn.*
T. subflava, *Lloyd.* On living *Celtis kraussiana*.
T. tomentosa, n.sp. (MS. name).
T. violacea, *Lloyd.*
T. Zimmermannii, *Bres.*
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XXIX.—DECADES KEWENSES

PLANTARUM NOVARUM IN HERBARIO HORTI REGII
CONSERVATARUM.

DECAS CVI.

1051. *Vochysia hondurensis*, *Sprague* [Vochysiaceae]; affinis *V. guatemalensi*, Donn. Smith, a qua foliis obovato-oblongis vel oblanceolatis haud acuminatis et floribus minoribus recedit.

Arbor magna trunco recto cylindrico (fide *Hummel*). *Ramuli* validi, subquadrati costa a quaque stipula usque ad nodum inferiorem decurrente, fulvi vel atrobrunnei, glaberrimi, densiuscule sed inconspicue lenticellati. *Folia* quaternatim verticillata, obovato-oblonga vel oblanceolata, apice rotundata vel obtusissima, basi obtusa vel subcuneata, 6–14 cm. longa, 2.5–5 cm. lata, coriacea, brunnescentia, inconspicue crebre reticulata, glaberrima, subdiscolora, supra via nitidula nervo medio leviter impresso nervis lateralibus primum inconspicuis tandem leviter impressis magis obviis, subtus nervo medio prominente lateralibus prominulis; nervi laterales utrinque 10–13, patuli, arcuato-ascendentes, 4–7 mm. intra marginem anastomosantes; petioli 1.5–2.5 cm. longi, graciles; stipulae e basi lata subulatae, 2–3 mm. longae, pilosulae. *Thyrsi* 15–20 cm. longi, minute pilosuli, rhachi angulata profunde canaliculata subtiliter striata; cincinni circiter 5-flori; pedunculi 4–8 mm. longi; pedicelli 5–8 mm. longi. *Flores* calcare excluso 1–1.3 cm. longi. *Calycis* segmenta antica ovata, obtusa, 3 mm. longa, 2 mm. lata, glabra vel sparse ciliolata; segmenta lateralia deltoideo-ovata, 1.5 mm. longa, 1.5–1.8 mm. lata, ciliolata; segmentum posticum 9 mm. longum, (explanatum) 5.5 mm. latum, calcare descendente 6–6.5 mm. longo. *Petala* elliptico-ovata; petalum medium 5 mm. longum, 4 mm. latum; lateralia paullo minora. *Filamentum* 3 mm. longum; anthera 6 mm. longa, 1.5 mm. lata. *Ovarium* glabrum, 1.3 mm. longum; stylus 2.5 mm. supra basin sigmoideo-curvedus, deinde erectus sensim ampliatus, parte superiore 8 mm. longa.

BRITISH HONDURAS. Belize, *E. F. J. Campbell* 10 (type); Punta Gorda, *C. Hummel*.

According to Mr. Campbell, *V. hondurensis* is a timber tree with soft wood used extensively for making small boats. Mr. Hummel states that it is a tree of large size, straight and cylindric, yields a good wood for boards, and is common in the South of the Colony. The vernacular name of the species is "Yemerí."

1052. *Vochysia tabascana*, *Sprague* [Vochysiaceae]; affinis *V. guatemalensi*, Donn. Smith, a qua foliis oppositis brevioribus pro rata latioribus apice vix cuspidatis, rete venularum valido, calcare floris descendente recedit.

Ramuli laeves, purpureo-brunnei, glaberrimi, profunde canaliculati. *Folia* opposita, elliptico-oblonga, apice brevissime latissime subcuspidata, basi obtusa vel subcuneata, 5-10.5 cm. longa, 2.5-5 cm. lata, coriacea, lutescentia, utrinque valde reticulata, glaberrima, supra nitida nervo medio et lateralibus prominulis, subtus opaca nervo medio prominente lateralibus prominulis; nervi laterales utrinque 9-10, basi patuli, arcuato-ascendentes, 2.5-5 mm. intra marginem anastomosantes; petioli 1-2 cm. longi, graciles; stipulae e basi deltoidea subulatae, usque ad 2 mm. longae. *Thyrsi* circiter 15 cm. longi, minute puberuli, rhachi angulata profunde canaliculata subtiliter striata; cincinni 2-5-flori; pedunculi 5-7 mm. longi; pedicelli 5-6 mm. longi. *Flores* calcare excluso 1.1-1.4 cm. longi. *Calycis* segmenta antica late ovata, rotundata, 2-2.2 mm. longa, 2.5 mm. lata, ciliolata; segmenta lateralia 1 mm. longa, 1.5 mm. lata; segmentum posticum 9-13 mm. longum (explanatum) 6 mm. latum, calcare descendente crasso 7.5 mm. longo. *Petala* ciliata; medium 4-5 mm. longum, lateralia minora. *Filamentum* 3 mm. longum; anthera 5.5-6.5 mm. longa, 1.3-1.5 mm. lata. *Ovarium* glabrum, 1.2 mm. longum; stylus rectus, 8.5 mm. longus, superne vix ampliatus.

MEXICO. Tabasco; between Atasta and La Tejeria, *Rovirosa* 792.

1053. *Rhus costaricensis*, Riley [Anacardiaceae-Anacardieae]; affinis *R. terebinthifoliae*, Cham. et Schlecht., a qua indumento formaque foliolorum differt.

Rami dense fulvo-tomentosi, striati, lenticellis magnis conspicuis. *Folia* imparipinnata, 3-4-juga, 9-13.5 cm. longa, rhachi dense fulvo-tomentosa, flexuosa. *Foliola* satis remota, circiter 1.5-2 cm. distantia, obliqua, integra, ovato-oblonga, submucronato-acuminata, basi valde inaequalia, latere superiori rotundato, inferiori acuto, brevissime petiolulata, 4-5 cm. longa 1.5-2.5 cm. lata, supra praecipue secundum costam nervosque laterales insculptos pilosa, subtus dense fulvotomentosa, costa nervisque lateralibus valde prominentibus. *Paniculae* magnae, ramis folia longe superantibus, ubique dense fulvo-tomentosae, ramis ramulisque flexuosis. *Bractae* vix 1 mm. longae, triangulares, obtusae, utrinque pilosae, marginibus ciliatis. *Sepala* 5, ovata, obtusa, dimidium petalorum aequantia, marginibus ciliatis exceptis glabra. *Petala* 5, ovata, basi plus minusve cordata, apice rotundata, 1.5 mm. longa, 1 mm. lata, extra glabra, intus sparsae sericeae, marginibus ciliatis. *Stamina* 5, petalis multo breviora. *Ovarium* ovoideum, pubescens; styli connati, breves, stigmatibus capitatis. *Drupae* circiter 6 mm. diametro, longe pilosae.

COSTA RICA. Prov. San José: Rio Virilla, 1100 m., fl. and fr. Dec., *Tonduz in Donn. Smith* 6999 (*Herb. Inst. Nac. Costaric.* 9823) (type); Prov. Cartago, near Cartago, 1275 m., fr. March, *Cooper in Donn. Smith* 5729.

A specimen collected by Heyde and Lux at Carrizal, Dep. Santa Rosa, Guatemala, alt. 1500 m. (*Donn. Smith* 4330) probably belongs to *R. costaricensis*, but the leaflets have longer petiolules, and are larger and thinner.

1054. *Acacia pseudo-eburnea*, *J. R. Drumm. MS. ex Dunn* [Leguminosae-Mimoseae]; ab *A. Campbellii*, Arn., pinnis 3-4-paribus, petiolis eglandulosis, corollis calyce sesquolongioribus differt.

Frutex parvus, ramulis ut aculeis rhachibusque foliorum et pinnarum pubescentibus, aculeis stipularibus binis 1-1.5 cm. longis rectis tenuibus. *Folia* 3-4-juga, 3-4 cm. longa, glandulis infra jugum supremum et saepe infra juga alia instructa, petiolo eglandulosoq; pinnae 1.5-2 cm. longae; foliola 8-10-paria, oblonga, obtusa, mucronata, 3 mm. longa, glabra. *Capitula* axillaria, solitaria vel bina, sub anthesi lutea, 1.5-2 cm. diametro; pedunculi 3-4 cm. longi, pubescentes, bracteis parvis 2-3 medio cincti. *Flores* sessiles, ∞ . *Calyx* 1.5 mm. longus, glaber, dentibus minutis. *Corolla* 2.5 mm. longa, glabra dentibus triangularibus 1 mm. longis. *Stamina* ∞ . *Legumen* 5-10 cm. longum, 5-6 mm. latum, breviter stipitatum, glabrum, suturis paullo incrassatis, inter semina leviter constrictum. *Semina* oblonga, compressa, 6 mm. longa.

N.W. INDIA. Kumaon, *Stewart* 96; The Bhabar at 500 m., 1852, *Strachey* and *Winterbottom* 3; Hardwar 330 m., Jan. (flower) 1845, *Thomson* 893, *Major Madden*, 1852; Mohan Rau, Saharanpur, Siwaliks at 500 m., 11.2.1922 (flower) *Parker* 55.

1055. *Vaccinium glaucescens*, *Riley* [Vacciniaceae-Vaccinieae]; affinis *V. angustifolio*, Benth., glabritie et glaucitiae, pedicellis longioribus et positu bracteolarum differt. *Fruticulus* ramis angulatis glabris, novellis glaucis. *Folia* brevissime petiolata, oblongo-lanceolata, 2-4 cm. longa, valde acuminata, coriacea, utrinque glabra et glauca, conspicue nervosa, minute et remote dentata. *Racemi* 6-8 cm. longi, foliati, a basi ramulorum ad apicem florentes. *Pedicelli* axillares solitarii, recurvi, glauci, circiter 8 mm longi. *Bracteolae* lineari-lanceolatae, acuminatae, vel angustiores subulatae, 3-6 mm. longae, medio pedicelli vel superius insertae, glaucae. *Calycis* lobi triangulares, acuti vel acute acuminati, glabri. *Corolla* 4 mm. longa. *Antherae* longissime aristatae, glabrae.—*V. angustifolium* var *glaucescens*, Benth. Pl. Hartw. p. 45 (1840).

MEXICO. Tepic; Bolaños, *Hartweg* 342 β (type).

1056. *Clethra tomentella*, *Rolfe MS. ex Dunn* [Clethraceae]; affinis *C. luzonicae*, Merrill, sed foliis basi attenuatis et racemis laxis differt.

Arbor parva, cortice ramulorum brunneo striato instructa. *Folia* alterna, apicibus ramulorum aggregata, oblanceolata, apice acuminata, basi attenuata, 6-11 cm. longa, sparse serrata sed fere integra, chartacea, subtus tomentella, supra glabra; venae 12-15-pares, subtus prominentes; petioli 5-12 mm. longi.

Paniculae terminales, 20 cm. longae, racemis multis elongatis angustis laxis divergentibus; bracteae lineares, 5 mm. longae, caducae, ut calyces, pedicelli pedunculique tomento brevi rufo vestitae. *Calyx* 2 mm. longus, e sepalis 5 imbricatis lanceolatis basi paullo unitis compositus. *Petala* obovata, basi breviter coalita, 3 mm. longa. *Stamina* inclusa. *Ovarium* ovatum, 1 mm. longum; stylo brevi bilobo.

PHILIPPINE ISLANDS. Benguet; Tonglou, A. Loher 3790; Elmer 6283 (May 1904): Rizal, A. Loher 6193 (Aug. 1905); 6177 (19 Sept. 1905).

1057. *Veronica rigida*, Turrill [Scrophulariaceae-Digitaleae]; affinis *V. Chamaedrys*, L., sed caulibus rigidioribus ramosioribus, foliis petiolatis, infrutescentiis saepe longioribus, pedicellis brevioribus, corollis minoribus differt.

Planta perennis (vel interdum biennis), caulibus cylindricis adscendentibus ramosis rigidis inferne pilis in lineis duabus dispositis instructis superne undique hirsutis. *Folia* oblongo-ovata vel ovata, apice subobtusata, basi subcordata deinde in petiolum angustata, usque ad 3.8 cm. longa et 2.7 cm. lata (petiolo excluso), saepissime minora et circiter 2 cm. longa et 1.5 cm. lata, margine inciso-dentata, in pagina superiore leviter hispida vel glabra nervis impressis, in pagina inferiore nervis prominentibus valde hispidis; petiolus 6-7 mm. longus, hispidohirsutus. *Inflorescentia* 3-12 cm. longa, glanduloso-hirsuta; bracteae lineari-lanceolatae, 4-5 mm. longae, 1 mm. latae, glanduloso-hirsutae; pedicelli floriferi 2 mm. longi. *Infrutescentia* usque ad 3.4 dm. longa; pedicelli fructiferi 4 mm. longi. *Calyx* 5 mm. longus, sepalis costis extra prominentibus instructis. *Corolla* 8-10 mm. diametro, intense caerulea, lobis lateralibus adaxialique 3-5 mm. latis, abaxiali circiter 2 mm. lato. *Stamina* 3 mm. longa, caerulea. *Ovarium* biconvexum, ambitu circulare, 0.75 mm. altum, marginibus apiceque albo-hirsutum; stylus 3.5 mm. longus, inferne albus, medio purpureus, superne intense caeruleus. *Capsula* obcordata, 3.5 mm. longa, 4 mm. lata, margine albo-hirsuta, saepissime pubescens; semina oblongo-orbicularia, pallide flava.

GREEK MACEDONIA. Southern slopes of Krusa Balkan; north of Karamudli, Turrill (seed-number) 49, seeds collected 18.6.17, in flower and fruit at Kew from May to September.

This plant was originally described (in *Kew Bull.* 1920, p. 192) as a variety of *Veronica Chamaedrys*, L. After cultivating it for five successive years and finding that its important differential characters remain constant it has been thought advisable to raise it to specific rank. In cultivation it has behaved both as a biennial and as a perennial, flowering the second and succeeding years after being sown.

A specimen collected by A. Baldacci, Iter Albanicum Septimum, in silvaticis Greča sub m. Kunj Kostić, distr. Kuči, 24 Julio 1900, No. 350, is probably specifically identical with

the plant here described. It has, however, more deeply and irregularly incised leaves.

1058. ***Beloperone flaviflora***, Turrill [Acanthaceae-Justicieae]; affinis *B. tenerae*, Turrill, sed planta fulvo-hirsuta, foliis multo majoribus, floribus flavis valde distincta.

Herba (vel suffrutex) erecta, caulibus subteretibus junioribus dense fulvo-hirsutis deinde subglabris. *Folia* oblongo-elliptica vel elliptica, usque ad 2.75 dm. longa (petiolo excluso) et 1.1 dm. lata, apice acute acuminata basi cuneata vel acuta, costa nervisque in pagina utraque conspicuis pilis fulvis in juventute praecipue instructis, nervis lateralibus utrinsecus circiter 12; petiolus usque ad 6 cm. longus, fulvo-hirsutus. *Inflorescentiae* axillares vel terminales; bracteae lineari-lanceolatae, 3 mm. longae, extra dense glanduloso-puberulae, caducae; bracteolae lineares, 2.5 mm. longae, dense glanduloso-puberulae. *Calycis* segmenta lanceolato-lineararia, acuta, 5 mm. longa, 1 mm. lata, puberula. *Corolla* anguste cylindrica, superne leviter ampliata, 2.8 cm. longa, flava, extra glanduloso-puberula, labio adaxiali 1.2 cm. longo apice emarginato, abaxiali 1.2 cm. longo leviter aequaliterque trilobato. *Stamina* 2, leviter exserta, filamentis 1.8 cm. longis inferne pilis brevibus reflexis instructis, antheris dithecis, thecis superpositis utrisque vix 2 mm. longis calcaratis; pollinis granula ellipsoideo-oblonga, 55–58 μ longa, 32–33 μ diametro. *Ovarium* cylindrico-conoideum, 3 mm. altum, basi 1.25 mm. diametro, puberulum; stylus 2.2 cm. longus, inferne puberulus.

WEST INDIES. Trinidad: heights of Aripo; Jan. 13, 1922, R. O. Williams.

This is a very distinct species of *Beloperone*. It is related to a plant collected by C. G. Pringle at Las Canoas, State of San Luis Potosi, Mexico, 1891, No. 3933, and described by B. L. Robinson in Proc. Amer. Acad. xxvii. p. 183, 1892 as *Beloperone fragilis*, Rob. Unfortunately this name cannot stand, since the same combination had been used long previously by Martius in Flor. Bras. ix. p. 140, 1847, to designate a plant, which, from the description, is a quite distinct species, from Prov. Bahia, Brazil. For the Mexican plant it is proposed that the name *Beloperone tenera*, Turrill, should be substituted for *Beloperone fragilis*, Robinson.

1059. ***Isotheca***, Turrill [Acanthaceae-Justicieae]; genus novum affinis *Herpetacantho*, Nees, sed floribus in thyrsum terminalem dispositis, staminum abaxialium thecis aequalibus parallelis, pollinis granulis ad typum "Stachelpollen" pertinentibus distincta.

Calyx 5-partitus, segmentis angustis acutis subaequalibus. *Corollae* tubus elongatus, superne parum ampliatus; limbus 2-labiatus, labio adaxialo ex segmentis 2 lateralibus composito, abaxiali breviter trilobo. *Stamina* 4, didynama, filamentis basi per paria lateralalia connatis; antherae staminum adaxialium monothecae, abaxialium dithecae, thecis oblongis aequalibus parallelis muticis. *Pollinis* granula sphaeroidea, typi "Stachel-

pollen." *Discus* annularis, brevis. *Stylus* filiformis, apice minute 2-dentatus; ovula in quoque loculo 2. *Capsula* (fere matura) oblongo-clavata, basi in stipitem longum solidum contracta.—*Herba* vel suffrutex, erecta. *Folia* integerrima. *Flores* pedicellati, flavi, fasciculati vel solitarii, in axillis bractearum parvarum in thyrsium terminalem dispositi.

I. alba, *Turrill*, species unica. *Caules* erecti, glabri. *Folia* elliptica, apice acute angustata vel acuminata, basi in petiolum cuneato-angustata, usque ad 2.2 dm. longa (petiolo excluso), costa nervisque in pagina superiore subimpressis, in pagina inferiore conspicuis, lateralibus utrinsecus circiter 12 marginem versus anastomosantibus, glaberrima; petiolus usque ad 5 cm. longus, glaber. *Inflorescentia* thyrsoides, terminalis, cum pedunculo 3 cm. longo 2 dm. longa, glabra. *Calycis* segmenti 5, lanceolato-aciculares, subaequales, apice acuminati, 7 mm. longi. *Corolla* alba (ex *Williams*), tubo 4 cm. longo fauce 8 mm. diametro glabro; labii adaxialis segmenta 2, lateralia, 7 mm. longa, 2.5 mm. lata, labio abaxiali trilobo, lobis subaequalibus 1.5 mm. longis. *Stamina* leviter exserta; antherae thecis 4 mm. longis, filamentis circiter 4.5 cm. longis; pollinis granula circiter 65 μ diametro. *Ovarium* cylindricum, 3 mm. altum, 1.5 mm. diametro, glabrum, loculis 2 biovulatis; stylus 5.5 mm. longus.

WEST INDIES. Trinidad; heights of Aripo, Jan. 13, 1912, *R. O. Williams*.

1060. ***Leucas helicterifolia***, *Haines* [Labiatae-Stachydeae]; *L. lanatae*, Benth. affinis, sed indumento et foliis lanceolatis acutis serratis nec crenatis differt.

Herba caulibus pluribus subdiffusis 30–50 cm. longis vix ramosis quadrangulatis, pilis suberectis longis brevioribusque dense obtectis. *Folia* lanceolata vel anguste oblongo-lanceolata acuta 4–6 cm. longa, 0.8–1.5 cm. lata, serrata, supra pilosa, pilis basibus tumidis, subtus dense villosa praecipue in nervis; nervi laterales 3–5 obliqui; petioli inferiores ad 5 mm. longi. *Flores* albi, sessiles, in verticillastris multifloris axillaribus dispositi, bracteis setaceis 2–4 mm. longis, pilosis. *Calyx* tubulosus, 7–9 mm. longus; tubus rectus vel leviter incurvus, intra parce sericeus, nervis 10 fortibus pilosis, ore aequali, dentibus triangularibus acutissimis minutis erectis ciliatis. *Corollae* tubus 9–10 mm. longus, pubescens; labium superum 4 mm., labium inferum 6 mm. longum subtus pubescens.

INDIA. Bihar & Orissa: Ramnagar Hills; 300–600 m., *Haines* 4995.

XXX.—ADDITIONS TO THE WILD FAUNA AND FLORA OF THE ROYAL BOTANIC GARDENS, KEW: XVI.

BARK BEETLES (COLEOPTERA).

W. DALLIMORE and J. W. MUNRO.

Phloeosinus thujae, *Perris* (The Thuya Bark Beetle). The abnormal drought of 1921 seriously affected the health of many trees at Kew and those that were unduly weakened have been carefully watched during the present year for signs of improved health or further deterioration.

Amongst the enfeebled trees were two specimens, at least 40 to 50 years old, of *Thuya orientalis* near the Cumberland gate. In the autumn of 1921 they had an unhealthy appearance and the winter rains effected little improvement. During late spring a number of branches died and by the end of June the bark had begun to separate from the wood. On examination the presence of a bark beetle was detected. This was submitted to Dr. J. W. Munro, Entomologist to the Forestry Commission, who identified it as *Phloeosinus thujae*, *Perris*, a beetle that had not hitherto been found in Britain although it is known to occur on the Continent on species of *Thuya*, *Cupressus*, and *Sequoia*, and also on *Juniperus communis* and *J. Sabina*, attacking sound healthy trees, its attack beginning on the uppermost twigs and spreading downwards. Towards the end of July the beetle was found on *Cupressus pisifera* in another part of the gardens, half a mile from the original locality.

Dr. Munro has kindly contributed the following particulars respecting this beetle together with highly magnified drawings of the insect and its main and secondary galleries.

"*Phloeosinus thujae* belongs to the Hylesininae group of the bark beetles and is allied to the genus *Hylesinus* or ash-bark beetles. It is very dark brown or almost black in colour, about $\frac{1}{2}$ in. long. and differs from the ash-bark beetles in several important characters, of which, the absence of tubercles on the thorax, the deeply indented margin of the eyes, and the structure of the antennal club are the chief.

"The brood galleries of *Phloeosinus* are typical for the genus. Like those of the ash-bark beetles the mother galleries are two-armed but unlike these last they are cut parallel to the stem axis and not across it.

"It is at present difficult to determine whence these beetles came to Kew. They may have been imported on *Thuya* or they may yet prove to be indigenous in England. The first surmise is probably the correct one."

However interesting the discovery of an injurious insect new to Britain may be to the entomologist it is disquieting to the cultivator and emphasises the danger of importing insect and

other pests with nursery stock. It is probable that in the present instance the beetle may have been present at Kew in small numbers for many years and escaped detection until the sudden enfeeblement of the host plants from another cause, made it possible for the beetles to increase rapidly in numbers and kill the branches. It is well known that the elm-bark beetles may be present on healthy trees for many years causing little harm, whereas, after the weakening of the trees by other agencies, the beetles rapidly increase in numbers and kill the trees.

The rapidity with which a disease is able to spread on closely cropped ground emphasises the necessity for gardeners, foresters, and farmers, to be constantly on the alert. Diseases, whether of fungus or insect agency, usually appear in the first instance on single plants or on limited areas and the application of a wash or burning a few plants at the outset may prevent an epidemic that would do incalculable harm at a later date were they neglected. The supply of clean nursery stock is also of vital importance in the control of disease and care should be taken to clean any infected stock before it leaves the nursery.

The appearance of the thuya bark beetle at Kew affords a good opportunity of directing attention to other bark beetles found in the gardens and on the invitation of the Director, Dr. Munro has prepared the following list, with drawings of the galleries of some of the principal genera found in the sap-wood and bark.

The discovery of the bark beetle *Phloeosinus thujae*, Perris. in the Royal Botanic Gardens, by Mr. Dallimore, has called attention to the Kew bark beetles generally. No list of these has so far been published and except for an exotic species, *Xyleborus morigerus*, Bland., recorded by Pearson in *K. B. Additional Series V*, there is no mention of bark beetles in the Kew fauna lists. The following list therefore, based on observations made by the writer during the last two years and on material collected by Mr. Dallimore, has been prepared at the Director's request.

Scolytus destructor, Ol., (Large Elm Bark Beetle).—This species is abundant in Kew on elms. It increased in numbers during 1921 probably owing to the favourable conditions produced by the drought.

Scolytus multistriatus, Marsh., (Small Elm Bark Beetle).—This species is found together with *S. destructor* but is less common. Both these species are accompanied by the Elm Bark Weevil (*Magdalis armigera*, F.).

Scolytus pruni, Ratz., (Large Fruit-tree Bark Beetle).—A few specimens have occurred in the Director's Orchard and one brood was reared on cherry laurel (*Prunus Laurocerasus*), in Cambridge Cottage Garden in 1921, in a hawthorn log in Queen's Cottage Grounds, 1922, and on *Prunus Padus* in the Upper Nursery, 1922.

Scolytus intricatus, Ratz., (Oak Bark Beetle).—This species is common throughout the gardens on various oaks and on sweet chestnut.

Scolytus rugulosus, Ratz., (Small Fruit-tree Bark Beetle).—Common on various fruit trees in the Director's Orchard, and on *Prunus Padus* in the Upper Nursery, 1922.

Hylesinus fraxini, Panz., (Ash Bark Beetle).—Probably common on *Fraxinus* in Queen's Cottage Grounds and on lilac (*Syringa vulgaris*), 1922.

Hylesinus vittatus, F., (Elm Hylesinus).—On elm along with *Magdalis armigera*.

Phloeosinus thujae, Perris, (Thuya Bark Beetle).—Found on *Thuya orientalis* near the Cumberland Gate, July 1922. Not previously recorded for Britain, and on *Cypressus pisifera*, July 1922.

Myelophilus piniperda, L., (Pine-shoot Beetle).—Not uncommon in the Pinetum.

Hylurgops palliatus, Gyll., (Brown Pine Beetle).—On pine and spruce logs in the Stable Yard.

Hylastes ater, Payk., (Black Pine Beetle).—On pine logs in the Stable Yard.

Dryocaetes villosus, F.—On oak and sweet chestnut in Queen's Cottage Grounds.

Cryphalus (Ernoporus) fagi, F., (Beech Bark Beetle).—On beech twigs and branches throughout the gardens. Until recently this species was considered rare in England. Mr. Chrystal finds it abundant in Epping Forest and the writer has recently found it near Wotton in Surrey.

Cryphalus abietis, Ratz., (Fir Bark Beetle).—Its galleries have been found on *Abies* spp.

Pityogenes bidentatus, Hbst.—On *Pinus* spp. in the Pinetum and Stable Yard.

Pityogenes chalcographus, L.—On scaffold-poles in the Stable Yard. Undoubtedly an importation. Not established in the Gardens.

Pityophthorus pubescens, Marsh.—On pine twigs in the Pinetum.

Xyleborus saxeseni, Ratz.—On cherry trees in the Director's Orchard, on oak, sweet chestnut and beech in Queen's Cottage Grounds and on a *Catalpa* log from the Gardens.

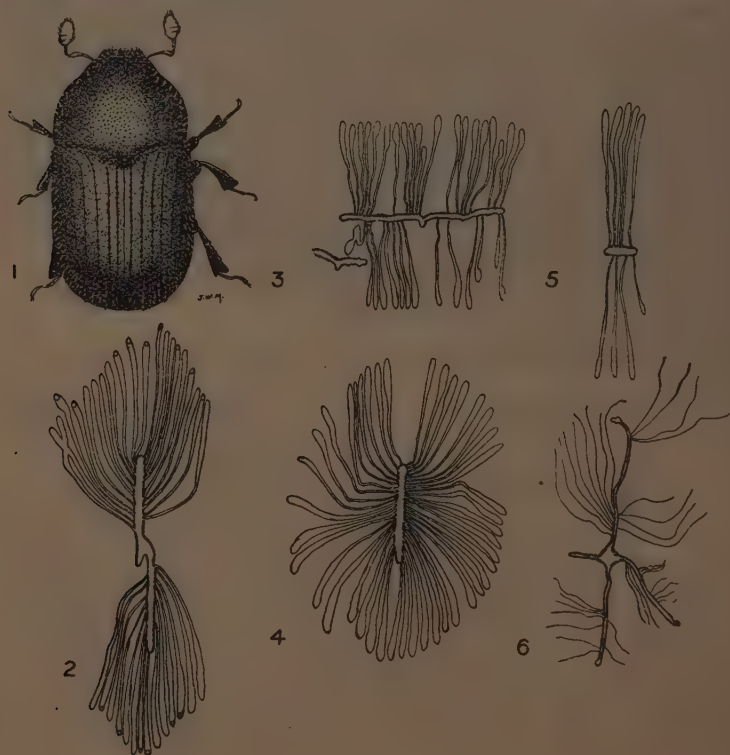
Trypodendron domesticum, L.—On oak and beech logs in the Stable Yard.

This list is probably incomplete but it is interesting in that with the exception of *Pityogenes chalcographus* and the possible exception of *Phloeosinus thujae* it contains no exotic species and no peculiarly northern species. All the above bark beetles except for the two species named are more or less common in Surrey and the South of England generally. As might be expected some of the host trees recorded for certain species are unusual. Thus lilac is not a usual host in Britain for *Hylesinus*

fraxini although it is cited by various authors for that species in Central Europe. The occurrences of *Scolytus pruni* on cherry laurel and of *Xyleborus saxeseni* on *Catalpa* are also unusual and are due to the rich flora present in the gardens affording a wide range of hosts.

Another feature of the list is the small number of pine-dwelling species recorded. This is probably due to the early removal of trees that are not thriving and of all felled stems and broken branches. While this applies to the pine dwellers it is obviously not applicable to the hard-wood dwelling bark beetles, for many elms in particular support a number of *Scolytus* broods which readily increase under favourable conditions—a phenomenon that deserves to be recognised and studied by all interested in Arboriculture.

A further interesting feature of the bark beetle conditions in Kew is the very important part played by the woodpeckers and tits in keeping these insects within bounds. Two species of woodpecker occur, the green and the lesser spotted woodpeckers, and of these the latter accounts for more than half of the bark beetle broods reared. The tits, blue tit, great tit and others, are chiefly enemies of the smaller bark beetles, especially the twig dwelling species.



DESCRIPTIONS OF FIGURES.

The galleries found in the sap-wood and inner bark are as a rule of generic significance.

Fig. 1. *Phloeosinus thujae* much enlarged. Natural length, $\frac{1}{2}$ in.

Fig. 2. *Phloeosinus thujae*.—Mother gallery long and perpendicular, running in both directions from the centre; larval galleries long inclining from the centre towards each end.

Fig. 3. *Hylisinus fraxini*.—The mother gallery is horizontal, running in both directions from the centre with long right-angled larval galleries.

Fig. 4. *Scolytus destructor*.—Mother gallery long and perpendicular; larval galleries long, close together, inclining from the centre towards each end.

Fig. 5. *Scolytus intricatus*.—Mother gallery short, horizontal; larval galleries at right angles, long.

Fig. 6. *Pityogenes bidentatus*.—Mother galleries star-shaped (beetles polygamous); larval galleries long, slender and irregular.

XXXI.—DIAGNOSES AFRICANAE: LXXVI.

1671. *Xylothea Kotzei*, Phillips [Flacourtiaceae—Onco-beae]; affinis *X. lasiopetalae*, Gilg. et *X. Kraussianae*, Hochst.; ab hac foliis longioribus coriaceis, nervis subtus prominentibus, ab illa foliis longioribus glabris recedit.

Frutex ramis glabris in sicco sulcatis. *Folia* petiolata; lamina lanceolata vel lanceolato-elliptica, nonnunquam breviter acuminata, obtusa, basi leviter angustata, 4–11.5 cm. longa, 1.5–3.3 cm. lata, integra, glabra, venatione distincta, costa et nervis subtus prominentibus; petioli 0.4–1.5 cm. longi, puberuli. *Racemi* terminales vel axillares, pauciflori. *Flores masculi*: pedicelli 2.8 cm. longi, breviter hirsuti. *Sepala* 3, oblonga, apice rotundata, 1.5 cm. longa, 7 mm. lata, extus sparse glandulosa et pubescentia marginum partibus tectis glabris, ciliata. *Petala* circiter 9, apice rotundata, in basin angustata, 2.2 cm. longa, superne 1 cm. lata, extus breviter villosa. *Stamina* numerosa; filamenta 5 mm. longa; antherae lineares, obtusae, basi subsagittatae, 5.5–6 mm. longae. *Flores feminei* non visi. *Fructus* ellipsoideus, 2.2 cm. longus, 1.5 cm. diametro, unilocularis placentis parietalibus, aliquantum pustulatus, minute pubescens, costis 6 longitudinalibus.

SOUTH AFRICA. Zululand: Empangeni Forest Plantation, P. C. Kotze in *National Herbarium, Pretoria*, 1478, 1652, and in *Herb. Forest Dept.* 3537, 3747. Port Durnford Plantation, Prior in *National Herbarium, Pretoria*, 1479 (type), and in *Herb. Forest Dep.* 3632.

1672. *Rhinopteryx angustifolia*, *Sprague* [Malpighiaceae-Banisterieae]; ab *Rh. spectabili*, Niedenzu, unica specie hactenus cognita, ramulis inflorescentiaeque rhachi gracilioribus, foliis anguste oblongo-oblanceolatis breviter acuminatis, antheris subtruncatis, fructu majore differt.

Arbor parva. *Ramuli* castanei, exsiccando costulati, mox glabrescentes, 2 dm. infra inflorescentiam 5 mm. diametro: internodia 2·5–5 cm. longa. *Folia* anguste oblanceolata, apice breviter subacuta acuminata, versus basin longe angustata. 14–18 cm. longa, 3·5–4·5 cm. lata, coriacea, supra juventute molliter pilosa, nervo medio excepto mox glabrata, subtus breviter molliter pilosa vel glabrata, nervo medio et lateralibus necnon rete venularum promientibus; petioli circiter 5 mm. longi, supra breviter villosi. *Racemus* terminalis, sub fructu ad 3·5 dm. longus. *Bractae* subulatae, 4–5 mm. longae; bracteolae iis conformes, 2·5–3 mm. longae; pedicelli 1·5–2 cm. longi (sub fructu). *Calyx* extus basi glandulis 3 circularibus brunneis unilateraliter ornatus; sepala extus breviter brunneo-villosa, difformia; sepalum impar, quod a glandulis maxime remotum est, 5·5 mm. longum, 3·5 mm. latum, subrhomboideum, nempe inferne suboblongum, in basin per 3 mm. leviter angustatum, superne depresso-deltaeum; sepala duo intermedia (nempe interiora et non-glandulifera) elliptica, 5 mm. longa, 3·5 mm. lata; sepala duo glandulifera oblonga, subcuspidata, 4 mm. longa, 2·5–3 mm. lata. *Flores* albi (*McLeod*). *Petala* non visa. *Filamenta* 2 mm. longa; antherae 4–4·5 mm. longae, subtruncatae, interdum minute biapiculatae. *Mericarpi* alis 5·5–6 cm. longis 3–4 cm. latis.

TROPICAL AFRICA. Gold Coast: Northern Territory; savannah between Sambu and Pabia Lorha, *N. C. McLeod in Gold Coast Forest Herb.* 815.

An interesting addition to the genus *Rhinopteryx*, which has hitherto been supposed to be monotypic. The type-species *Rh. spectabilis*, Niedenzu, is a native of the Gambia Protectorate, and has obovate-oblong or elliptic leaves, up to 8 cm. broad, strongly apiculate anthers and smaller fruits.

1673. *Dialium Simii*, *Phillips* [Leguminosae-Cassieae]; inter species africanas foliolis ovato-lanceolatis breviter acuminatis emarginatis, petalis et staminibus 5, fructibus complanatis dense papilloso-glandulosis valde distincta.

Arbor 6–10 m. alta. *Folia* 7–9 cm. longa; foliola 3·5–6 cm. longa, 0·8–2·5 cm. lata, lanceolata vel ovato-lanceolata, breviter acuminata, apice emarginata, glabra, infra costis prominentibus. *Inflorescentia* diffusa. *Sepala* 5, 4·5–5·5 mm. longa, 2·5 mm. lata, oblonga, apice obtusa, pubescentia. *Petala* 5, 2 mm. longa, elliptica, basi unguiculata. *Stamina* 5; filamenta 1·5 mm. longa; antherae 2·5–3 mm. longae, ovato-lineares, breviter hispidulae. *Ovarium* setosum; stylus 2–3 mm. longus; stigma

discoideum. *Fructus* complanatus, late ellipticus, 2·5 cm. longus 1·5–1·8 cm. latus, dense papilloso-glandulosus.

TROPICAL AFRICA. Rhodesia : near Railway Station. Victoria Falls; a tree 20–30 ft. high, evergreen, with flowers and fruits both present, July 1920, *T. R. Sim* 19004; *F. A. Rogers* 5307 [Herb. Kew].

Sim's specimen was submitted to the Director of Kew who reported on it as follows :—" We find it matches fruiting specimens from the same spot, these were placed in *Dialium*. The fruit and basifixed anthers agree with those of this genus. You will note that both petals and stamens of your specimen number 5, while the generic description of *Dialium* gives "petals 1–2 or 0; stamens 2." The latter state is, however, obviously one of reduction, and as it can be linked with the perfect condition of your specimen by such a species of *D. Englerianum*, Henriques (Bol. Soc. Brot. 1899, 48) which has "petals 4, stamens 4–5," we should advocate the placing of Sim 19004 into *Dialium*, note being made of the extension of generic characters involved."

1674. ***Brunia albiflora***, *Phillips* [Bruniaceae]; species foliis linearibus laxe pilosis 1 cm. longis capitulis corymbosis floribus albis distincta.

Rami juniores villosi. *Folia* conferta, ascendentia, linearia, obtuse nigro-mucronata, 1·2–1·4 cm. longa, 0·5–1 mm. lata, supra plana et canaliculata, infra convexa, junioribus pilosis demum glabris. *Capitula* alba, terminalia, corymbosa, sphaerica; pedunculi 3 cm. longi, pilosi, bracteis linearibus carinatis rubro-brunneis, dense induti; axis inflorescentiae clavata, 8 mm. longa, 3 mm. crassa. *Bractee* lineari-spathulatae, basi angustatae, apiculatae, 5 mm. longae, 1 mm. latae, virides, extra dense villosae. *Sepala* linearia, apiculata, 3·5 mm. longa, villosa. *Petala* linearia, obtusa, basi angustata, 5·5 mm. longa, superne 1 mm. lata. *Filamenta* 4 mm. longa, linearia, glabra; antherae 1 mm. longae, lineares. *Ovarium* semi-inferum, 1·5 mm. longum, 0·75 mm. diametro, glabrum, 2-loculare, loculis 1-ovulatis; styli 2, basi liberi, teretes, 4·5 mm. longi; stigma simplex.

SOUTH AFRICA. Caledon Division: Hottentots Holland Mountains, Apr. 1922, *T. P. Stokoe* in *S. Afr. Nat. Herb.* 1669.

1675. ***Brunia Stokoei***, *Phillips* [Bruniaceae]; affinis *B. macrocephalae*, Willd., sed foliis brevioribus et angustioribus glabrescentibus, bracteis latoribus et brevioribus differt.

Rami glabri, basibus foliorum delapsorum verrucosi. *Folia* patula vel recurva, trigona, supra fere plana, costa elevata, infra carinata, obtusa, apice nigro-mucronata, 7–8 mm. longa, 1 mm. lata, glabra. *Capitula* depresso-globosa, conferta, circiter 3 cm. diametro; pedunculi 2–3 cm. longi, 5–7 mm. crassi, bracteis imbricatis lanceolatis obtusis 3 mm. longis 1 mm. latis infra carinatis glabris induti; axis 1·2–1·5 cm. longa, 7–9 mm. crassa, ovoidea; bractee obovato-spathulatae, subacuminatae, nigro-mucronatae, 7 mm. longae, superne fere angulo recto curvatae.

dorso in parte media dense villosae. *Sepala* 4, anguste linearia vel oblanceolata, 4.5 mm. longa, extra dense villosa. *Petala* triloba, linearia, 5.5 mm. longa, 0.75 mm. lata. *Filamenta* 5 mm. longa, teretia; antherae lineares, 1.25 mm. longae. *Ovarium* 2 mm. longum, 1 mm. diametro, ellipsoideum, superne dense villosum, 2-loculare, ovulis solitariis pendulis; styli 1-2, 4 mm. longi, teretes, a basi liberi, stigmatibus simplicibus. *Fructus* immaturi 3.5 mm. longi, 1.5 mm. diametro, ellipsoidei.

SOUTH AFRICA. Caledon Division: Hottentots Holland Mountains, near Hang Klip, April 1922, *T. P. Stokoe in S. Afr. Nat. Herb.* 1668.

1676. **Mussaenda Dawei**, *Hutchinson* [Rubiaceae-Mussaendeae]; affinis *M. angolensi*, Wernham, sed nervis lateralibus numerosioribus, pedunculis multo longioribus corollae pilis omnibus ascendentibus, calycis lobo petaloideo multo majore differt.

Frutex speciosus; rami laxe foliati, teretes, brunnei, rufo-hispido-pubescentes, internodiis 2.5-3.5 cm. longis. *Folia* late elliptica, breviter acuminata, basi brevissime cuneata, 9-14 cm. longa, 5-6 cm. lata, chartacea, integra, utrinque sparse hispida; costa supra dense hispida, infra prominens et setulosa et minute puberula; nervi laterales utrinsecus 15-16, infra conspicui, a costa sub angulo 65° abeuntes; petioli 1 cm. longi, rufo-pubescentes; stipulae parvae, triangulares, dense villosae. *Cymae* terminales, laxiflorae; cymulae pedunculatae, circiter 9-florae, pedunculis circiter 3 cm. longis rufo-hirsutis. *Flores* subsessiles. *Receptaculum* oblongo-obconicum, dense tomentosum. *Calycis* dentes triangulares, 1.75 mm. longi, tomentosi, uno magno petaloideo ovato-orbiculari breviter acute acuminato albo circiter 8 cm. longo et 6.5-9 cm. lato. *Corolla* 3.5-4 cm. longa; tubus subcylindricus, utrinque dense rufo-tomentosus, superne circiter 2.5 mm. diametro; lobi 5, ovati, acute acuminati, 6 mm. longi, 3.5 mm. lati, intra strigilloso-pubescentes. *Fructus* non visus.

TROPICAL AFRICA. Angola: Portuguese Congo; handsome shrub on the shores of the Quissanga Islands, Lower Congo River, 1921, *M. T. Dawe* 41.

1677. **Pteronia intermedia**, *Hutchinson et Phillips* [Compositae-Asteroideae]; affinis *P. onobromoidi*, DC., et *P. punctatae*, Phillips, ab illa foliis et capitulis multo minoribus, ab hac foliis alternis ramulis glabris differt.

Frutex circiter 30 cm. altus; rami breves, glabri. *Folia* alterna, carnosa, lineari-oblonga, apice rotundata, 0.4-1 cm. longa, 1.5-2 mm. lata, breviter setuloso-ciliata, glabra. *Capitula* solitaria, terminalia, plus minusve urceolata, circiter 1.5 cm. longa, fere 1 cm. diametro, circiter 30-flora. *Involucri bractae* 5-6-seriatae, superne incrassatae, marginibus anguste lacerato-membranaceis, exterioribus oblongo-ellipticis apice rotundatis 6-7 mm. longis 5.5 mm. latis, interioribus 1-1.2 cm. longis, 3 mm. latis obtusis. *Receptaculum* 5 mm. diametro, foveolatum. *Corollae tubus* 7 mm. longus, superne leviter ampliatus, lobis

3 mm. longis 1.25 mm. latis lanceolatis subobtusis. *Antherae* 3.5 mm. longae, appendice lanceolato-ovato. *Pappus* 7 mm. longus, setis basi connatis inaequalibus fere laevibus. *Achaenium* 2.5 mm. longum, obovoideum, longe dense pilosum.

SOUTH AFRICA. Flats near the Matjesfontein-Sutherland Road, and on the slopes of Ngaap Kop at Matjesfontein, shrub 1 ft. high with yellow flowers, Oct.-Nov., 1921, *W. J. Foley*, in *S. Afr. Nat. Herb.* 1517. Duplicate in *Herb. Kew.*

1678. ***Brachystelma floribundum***, *Turrill* [Asclepiadaceae-Ceropegieae]; affinis *B. lineari*, A. Rich., sed tubere multo majore, foliis longioribus et latioribus, floribus numerosioribus majoribus, coronae segmentis trilobatis lobis linearibus facile distinguitur.

Tuber ambitu orbiculare, 1.15 dm. diametro, 2.7 cm. crassum, leviter depresso-concavum, laeve, pallide stramineum. *Caules* 2-3, usque ad 6 cm. alti, cylindrici, puberuli, purpurei. *Folia* sessilia, lineari-lanceolata, acuta, usque ad 6.5 cm. longa et 9 mm. lata, costa nervisque in pagina superiore leviter impressis, in pagina inferiore prominentibus, nervis lateralibus marginem versus anastomosantibus, duobus infimis margini fere parallelis, supra glabra, infra ad costam puberula, margine et marginem versus pilis brevibus a basibus bulbosis purpureis orientibus instructa. *Flores* usque ad 12, ad nodos sublaterales, horizontales; pedicelli 1.2-1.5 cm. longi, puberuli. *Sepala* lanceolata, acuta, 4 mm. longa, basi 1.5 mm. lata, puberula. *Corollae tubus* late breviterque campanulatus, 7 mm. longus, 1 cm. diametro, extra pallide viridis maculis purpureis parvis instructus, intus pallide viridis lineis transversis et maculis purpureis instructus; lobi lineares e basibus triangularibus 2.8 cm. longae, patentes, supra nigro-purpurei, glaberrimi; plicae 5, 1 mm. longae, inter corollae lobis positae. *Coronae segmenta* 5, late ovata, purpureo-maculata, apice trilobata, lobis linearibus duobus lateralibus 1.7 mm. longis dense puberulis arcuato-erectis, lobo medio antherifero glabro incumbente; pollinia 0.5 mm. longa. *Carpella* cylindrica, 2 mm. longa, viridia, purpureo-maculata; styli apex discoideus, leviter convexus.

TROPICAL AFRICA. Rhodesia: grown in the Royal Botanic Gardens, Kew, from a tuber received from Mr. A. Hislop, Rhodesia, and described from the living plant, in flower 27.6.1922.

1679. ***Brachystelma lanceolatum***, *Turrill* [Asclepiadaceae-Ceropegieae]; affinis *B. Johnstonii*, N.E. Br., sed foliis lanceolatis, corollae lobis minus dense albo-villosis differt.

Planta perennis, caule solitario e centro tuberis oriente. *Tuber* disciforme, apice impressum, 3.5 cm. diametro, cinereum, glabrum. *Caulis* simplex, 1.5 dm. altus, teres, puberulus. *Folia* lanceolata, apice acuta, basi in petiolum circiter 0.5 cm. longum gradatim angustata, usque ad 6.5 cm. longa (petiolo excluso) et 1.1 cm. lata, costa in pagina superiore impressa, in inferiore prominente, nervis lateralibus pagina utraque inconspicuis, glabra vel fere glabra. *Flores* circiter 7, in caulis apicem conferti,

sessiles. *Corolla* fere 11 cm. diametro, lobis 5 cm. longis basi 5 mm. latis in caudas lineari-filiformes gradatim attenuatis extra glabris viridibus intus albo-villosis viridibus basi purpureo-maculatis, reticulatis, tubo campanulato 5 mm. longo 4 mm. diametro extra glabro purpureo intus fauce purpureo-lineato. *Corona* cupularis, viridis, dentibus 10 intus ad apicem leviter retrorsum barbatis praedita, et quinquelobata, lobis 1.25 mm. longis lineari-oblongis apice rotundatis incumbentibus.

TROPICAL AFRICA. Uganda: grown in the Royal Botanic Gardens, Kew, from a tuber received from Entebbe, and described from the living plant, in flower 6.6.1919.

1680. *Mimetes Stokoei*, Phillips et Hutchinson [Proteaceae-Proteaeae;] *M. saratili*, Phillips, affinis, sed perianthii lobis villosis et stigmatibus multo majoribus differt.

Rami villosi, densissime foliati. *Folia* ovata vel ovato-elliptica 6-6.5 cm. longa, 3-3.5 cm. lata, apice inaequaliter 3-dentata, raro integra, basi piloso-villosa, utrinque pilis sericeis appressis dense induta. *Capitula* sessilia 7 cm. longa, 10-12-flora, ad apices ramorum dense conferta. *Involucri bractearum* 3-4-seriatae, ovatae, oblongae vel lineares, obtusae, 1.3-2 cm. longae, 4-9 mm. latae, supra villosae, ciliatae. *Perianthii lobi* 4 cm. longi, basi lati, villosi; limbus 9 mm. longus, linearis, villosus. *Antherae* 5 mm. longae, lineares, apice glandulis 0.5 mm. longis ovatis subobtusis instructae. *Squamae hypogynae* 2 mm. longae, lineares. *Ovarium* 1 mm. longum, villosum; stylus 5.5 cm. longus, flavus, glaber; stigma 3 mm. longum, nigrum, apice ovoideo-globosum, rostratum, glabrum, basi paullo verrucosum.

SOUTH AFRICA. Caledon Division: Hottentots Holland Mountains; near Hangklip, Feb. 1922, *T. P. Stokoe in S. Afr. Nat. Herb.* 1642.

An exceptionally handsome species; in the living plant the styles are bright yellow and stigmas black; the leaves are very erect and hide the branches.

XXXII.—MISCELLANEOUS NOTES.

MAJOR T. F. CHIPP, M.C., B.Sc., Deputy Conservator of Forests, Gold Coast, since 1921, and formerly Assistant Director of the Botanic Gardens, Singapore (*K. B.* 1914, 227), has been appointed Assistant Director of the Royal Botanic Gardens, Kew. (See also *K.B.* 1909, 424; 1910, 132).

MR. M. T. DAWE, F.L.S., has been appointed by the Secretary of State for the Colonies, on the recommendation of Kew, Commissioner of Lands and Forests, Sierra Leone. (See also *K.B.* 1902, 24; 1911, 65; 1915, 306.)

MR. L. LEWTON BRAIN.—We learn with regret that Mr. L. Lewton Brain died at Kuala Lumpur on June 24th of heart failure after an attack of malaria. Mr. Lewton Brain was educated at St. John's College, Cambridge, and was subsequently appointed Junior Demonstrator of Botany in the University. In 1903 he was appointed Mycologist and Lecturer in Agriculture to the Imperial Department of Agriculture for the West Indies (*K.B.* 1903, 30), and later held the post of Assistant Director in the Division of Physiology and Pathology in the experiment station of the Hawaiian Sugar Planters' Association. When the post of Director of Agriculture in the Federated Malay States fell vacant in 1910, Mr. Lewton Brain was appointed to fill the position (*K.B.* 1910, 253), and on the abolition of this post last year he was appointed Technical Adviser in Agriculture to the Government of the Federated Malay States (*K.B.* 1922, 94). During the eleven years of his tenure of the Directorship the Agricultural Department of the Federated Malay States has been reorganised and greatly strengthened and is now one of the best equipped Agricultural Departments in the Colonies.

The Chinese Form of *Cornus Kousa*.—The Chinese form of this cornel, which was introduced from Western China in 1907, has flowered very beautifully this year at Kew and promises to be one of the best and most attractive of the new shrubs from that country. The species has, of course, long been known in gardens, but previous to the introduction of the Chinese plants, all those in cultivation were of Japanese origin. The floral beauty of *Cornus Kousa* is due solely to its bracts, of which four subtend the true flowers—small and inconspicuous—clustered in a head $\frac{3}{4}$ inch wide. The bracts are ovate-lanceolate, slender-pointed, and in the Chinese plants the largest of them are 2 to 3 inches long and 1 to $1\frac{1}{2}$ inches wide, creamy white, suffused with pink before they fade. On the Japanese plants previously in cultivation the floral bracts are smaller and narrower, but judging by specimens preserved in the Herbarium at Kew there do appear to exist in Japan forms of this species with bracts as large as those of Wilson's plants, although they have not been introduced. The garden value of the species is enhanced by the length of time the bracts remain in good condition; this year, in spite of the heat and drought in May and early June they were in beauty five or six weeks. Mr. Wilson found it as a shrub and as a small tree varying from 15 to 30 feet in height. It can be increased by cuttings, and in favourable seasons good seed no doubt will ripen. A figure of a Japanese form of *Cornus Kousa* appeared in the *Kew Bulletin* for 1915, page 179.

W. J. B.

The Big Tree of Tule.—Unless the comparatively few regions of the globe as yet botanically unexplored have some unsuspected

wonders to reveal in the way of ancient trees, it is not likely that any tree, or indeed any living organism exists that is older than the Big Tree of Tule. This tree is a near relative of *Taxodium distichum*, the well known "Deciduous" or "Swamp" Cypress of the Southern United States. It is known to botanists as *Taxodium mucronatum*, Tenore, and is a native of Mexico, where it is widely spread. The Big Tree of Tule grows in the churchyard of Santa Maria de Tule, which is about 18 miles south-east of Oaxaca and 250 miles from the City of Mexico. Its height is about 150 feet and the diameter of the trunk 50 feet; therefore, although of much shorter stature than the Sequoias or Mammoth trees of California, its trunk is considerably wider than that of the largest of them. There seems to be little doubt, too, that it is considerably older.

Although a calculation of the age of such a tree as this must be largely conjectural, there are data on which an estimate can be based. On other and younger trees of *Taxodium mucronatum* the annual rings have been counted and found to number about two hundred in a section twelve inches wide. The annual rings on young trees are normally thicker than on very old ones of the same species. It seems safe, therefore, in the case of the *Taxodium* of Tule, with its diameter of 50 feet (that is 25 feet from centre to circumference), to calculate its annual rings at 200 to the foot and to put its age at 5000 years. In spite of its age it appears to be still in perfect health. Mr. C. J. Chamberlain of the University of Chicago, who gives an interesting account of this tree in "School Science and Mathematics," Nov. 1921, states that in 1908, when he saw it, there was not a dead twig in sight. He goes on to say :—"Resting under the shade of the Big Tree and remembering its great age, one can hardly avoid thinking of events which have occurred during its lifetime. Before the Pyramids of Egypt were built it was a sturdy tree; and before Moses led the children of Israel out of the wilderness, it must have reached the usual size of the species; when Rome was founded, it must have been known as a big tree; in the days of King Arthur and his table round, its reputation as a giant among its kind must have been established; and ever since there have been Mexican traditions, Indians have made pious pilgrimages to the Big Tree of Tule. It must have been a familiar object to the pre-historic men who built the Pyramids on the nearby Monte Alban, and who erected the wonderful buildings now known as the Ruins of Mitla."

Taxodium mucronatum is represented at Kew at present by three trees, one of which is in the Temperate House, a second is growing at the edge of the Water-lily pond, and the third on the margin of the Lake. These trees were presented by Mr. H. J. Elwes in 1908 and are now 7 feet to 9 feet high. Although they grow slowly they are quite healthy and the two planted out-of-doors have not suffered very much through winter cold as yet. In habit and foliage they strongly resemble *T. distichum* but at

Kew retain some of their leaves, whilst *T. distichum* is quite deciduous. In Mexico, *T. mucronatum* is evergreen. There are two good photographs of the tree at Tule in Museum No. III., taken in 1898 and presented to Kew two years later by the late Hon. Charles Ellis. W. J. B.

Hooker's Icones Plantarum.—Since the last note on "Hooker's Icones Plantarum" appeared in the *Kew Bulletin*, 1913, p. 280, a complete volume (vol. xxxi = vol. i of the fifth series), containing plates 3001 to 3100, has been published, as well as a general index to volumes i-xxx, which was issued in 1919.

In the first part, published in January 1915, there are plates with descriptive text of plants belonging to 19 families. *Pareugenia* (t. 3004) is a new genus of Myrtaceae from the Fiji Islands. It is nearest allied to the section *Syzygium* of *Eugenia*. *Antherothamnus* (t. 3007) is a new monotypic genus of Scrophulariaceae, allied to *Freylinia*. *A. Pearsonii*, discovered by the late Prof. H. H. W. Pearson in South-West Africa, is described by him as "a charming shrub with flowers delightfully scented at night." Five plates are given to the Euphorbiaceae. *Plectaneia elastica* (t. 3024) a climbing shrub belonging to the Apocynaceae, and native of Madagascar, is said to yield a rubber of good quality.

Part 2, published in August 1915, contains figures and descriptions of representatives of 16 families. Five South African species of *Thesium* are included. The Leguminosae are represented by one species each of *Leptoderris*, *Millettia* and *Lonchocarpus*. *Leptoderris brachyptera* (t. 3028), from Senegambia and Angola, has "fragrant pink flowers produced so copiously in the dense forests of Cungulungulo (Angola) as to hide completely the tree on which the creeper grows." *Homozeugos* (t. 3033) is a new genus of Gramineae belonging to the tribe Andropogoneae of which two species, both Angolan, are known. Three species of *Meconopsis* are figured. *M. venusta* (t. 3036), collected by Mr. George Forrest in Yunnan, has deep red-purple flowers, and appears to be a particularly attractive plant.

Part 3, which appeared in June 1916, contains representatives of 14 families. Three species of Compositae are figured. *Pappobolus macranthus* (t. 3057) is the only known species of a new genus of Compositae (tribe Helianthoideae) from Bolivia. *Neowollastonia* (t. 3060) is a new genus of Apocynaceae allied to *Erratamia*. The only species (*N. tabernaemontanoides*) is a native of New Guinea. The Asclepiadaceae are represented by the new genus *Dalzielia* of which the single species (*D. oblanceolata*) is from Sierra Leone. A figure of a new genus of Zingiberaceae (*Eriolopha*), from New Guinea, occurs on t. 3067. Plates 3068 to 3075 are given to grasses, among them being three new genera: *Chloachne*, *Uranthoecium* and *Danthoniopsis*.

Part 4, completing the volume, was issued at the end of last June. It consists entirely of plates of grasses, with text by

Dr. Stapf. These grasses with few exceptions are Tropical African species which Dr. Stapf had investigated in the course of his elaboration of the family for the "Flora of Tropical Africa" and descriptions of which have appeared in volume ix of that work. Two new genera are published: *Diheteropogon* (t. 3093) and *Odyssea* (t. 3100). *Diheteropogon* was treated by Hackel as a section of *Andropogon*, and *Odyssea* is nearest allied to *Diplachne*.
S. A. S.

The Useful Plants of Nigeria.—With the publication of *Kew Bulletin*, Additional Series IX, Part IV, Mr. Holland's compilation of "The Useful Plants of Nigeria," is brought to a close. The first Part published in 1908, and of which a notice was given in *K.B.*, 1909, p. 427, gave a general introduction to the subject and detailed information of the plants comprised in the Natural Families *Ranunculaceae* to *Anacardiaceae*. The second part, published in 1911, continued with the *Anacardiaceae* and concluded with the *Araliaceae*. The third Part, published in 1915, dealt with the Natural Families *Rubiaceae* to *Labiatae*, whilst the present Part concludes the Dicotyledons, and covers the Monocotyledons, Filices, and Fungi. As an appendix to the last Part a list of books and papers dealing with West African subjects is given, and there is a complete index to all four Parts.

With the fourth Part is bound an Introduction and Preface. In the Introduction Sir David Prain, under whose auspices the work was planned and carried through so successfully, gives the reasons which called for this publication. The Flora of Tropical Africa "which has occupied much of the attention of the Herbarium Staff at Kew for more than half a century, and the completion of which at last appears in sight," provides a floristic study. In West Africa no attempt had hitherto been made at an economic survey of the vegetation and it was to supply this much-needed want that the present work was undertaken in the Museums at Kew. Mr. Holland's Nigerian service has rendered him eminently suitable for this task, and although the work is primarily intended to cover Nigerian plants, it will be found equally useful for all West African countries.

Mr. Holland in a brief Preface outlines the scheme followed in "The Useful Plants of Nigeria," to which he has devoted the greater part of his non-official work for the past sixteen years. The Parts have gradually increased in size, but it is chiefly the present greatly enhanced cost of production that has necessitated the very high price of the last Part. The published prices of the Parts are:—No. I, 2s.; No. II, 2s. 6d.; No. III, 3s. 6d.; No. IV, 1l.; or the complete volume, 1l. 8s.
T. F. C.

Gambia Plants.—Mr. M. T. Dawe, whilst on an official mission in the Gambia Colony on behalf of the Colonial Office early in

1921, made a collection of dried plants, a list of which has just been published.*

The specimens were determined at the Herbarium of the Royal Botanic Gardens, Kew, and were selected by Mr. Dawe mainly on account of their economic importance, as his visit to the colony was made in the season when few plants were in flower. About 115 species are enumerated with economic notes and native names. As the indigenous flora of the Gambian hinterland is not particularly well known, it is hoped that Mr. Dawe's wish will be realised that his collections should be added to by officials and others who travel in the colony, particularly with respect to the native names and uses of the plants.

Babington's Manual of British Botany.†—The appearance of a new edition of this well known work is a matter of some importance to all interested in the British flora. The chief impression gained by an examination of the work as now re-issued is that the present editor has been seriously handicapped by limitations placed on him by those whose desires he had perforce to respect. It is a matter of considerable regret that the whole work could not have been re-written for this edition and especially that the matter contained in Appendix II. could not have been incorporated in the body of the work. Appendix II. is undoubtedly the most valuable and interesting part of the present edition. In it Mr. Wilmott has brought together many of the recent results of the continued critical examination of British plants. Much has evidently been accomplished since the last edition of the Manual was published. Amongst other studies those of Pugsley on *Fumaria*, of Gregory and Drabble on *Viola*, of Lindberg and Salmon on *Alchemilla*, of Moss on *Salicornia* and *Ulmus*, of Druce on *Orchis* and other genera, are included in a summarised form.

The Preface is dated 24th April 1922, but it would appear, from internal evidence, that at least the name changes in the body of the book were made, irrevocably for this edition, several years ago. On the other hand, quite recent discoveries are recorded in Appendix II., though complaints about omissions will no doubt reach the Editor.

The convenient size of the new edition will appeal to field-workers, but the paper and binding will not withstand the long continuous wear to which a field reference book has of necessity to be subjected.

W. B. T.

* List of Plants collected in the Gambia, by M. T. Dawe, F.L.S., F.R.G.S., 11 pp. Bathurst: Gov. Printer, 1922.

† Manual of British Botany, by Charles Cardale Babington, Tenth Edition, edited by A. J. Wilmott, B.A., F.L.S. Gurney and Jackson, 33, Paternoster Row, London, E.C., 1922. Price 16s. net.

Presentation of Mr. William Hancock's Herbarium.—Mr. W. Hancock, F.L.S., the well-known collector of Chinese plants and for many years a regular correspondent of Kew, was born at Lurgan in Ulster in 1847. His taste for botany dates from his childhood when he was taught by his mother how to know, collect and preserve the wild flowers of Northern Ireland. He was sent fortunately to a private school at Lancaster where botanical study was encouraged. After further education at Queen's College, Belfast, and a short period of business experience in that town, he obtained an introduction to Sir Robert Hart and went out to China as a member of his staff in the Chinese Imperial Maritime Customs.

This appointment gave him ample opportunity in his spare time to pursue his chosen hobby. He originally got help as to the naming of his collections from Hance of Canton, and from Maximowicz of St. Petersburg, but soon became acquainted with Sir Joseph Hooker, then Director of Kew.

Impressed by Hancock's keenness and by his excellent preparation of specimens, Sir Joseph encouraged him to become a correspondent of Kew, and to number and label his future specimens in a methodical way. From that time a succession of packets of plants arrived at Kew containing sets of all that he collected. His chief fields were, of course, China and Formosa, but in his periods of leave he also visited Japan, Java, Sumatra and later Central America and the West Indies.

All this time Hancock was amassing a large private herbarium, and as it was labelled throughout with numbers corresponding with Kew determinations, it was one of considerable value. When he retired from the Chinese Imperial Service he settled with his sister at Bristol, where he died in 1914.

A large number of new flowering plants and ferns discovered by Hancock were named after him, and a new genus of orchids *Hancockia*, Rolfe, was published in 1903.

In accordance with his wishes his whole herbarium of about 10,000 specimens was after his death placed by Miss Hancock at the disposal of Kew, with the condition that the part not required for the Kew Herbarium should be given to the University of Bristol.

Abnormal Pine Stems.—A short time ago Mr. J. S. Gamble directed attention to the abnormal development of young pine trees in his plantations at Highfield, East Liss, Hants. The trees had normal trunks for a distance of several feet above the ground, they then suddenly became bent at right angles with the trunk, extending outwards for a distance of 5-7 inches, then by means of a curve and another sharp turn regained approximately the original vertical plane 12 inches or so above the lower bend.

The condition is common in some parts of the country and follows an injury to the young leading shoot. The injury may be due to a variety of causes, but frequently follows an attack by

the "Pine-shoot Tortrix Moth" (*Retinia buoliana*, Schiff.). The female deposits an egg at the extreme point of a shoot, near the base of the terminal bud, in July. A caterpillar appears in the course of a few weeks and gnaws a small wound at the base of the bud. This causes a flow of resin in which the caterpillar passes the winter. When growth begins in spring the caterpillar bores into the shoot and eats its way upwards along the pith. In many cases the leading shoot is killed. This results in the upward growth of a whorl of side branches, and eventually several leaders, all appearing at a sharp angle with the main stem. But at other times the leading shoot is less seriously injured, probably through some tragedy overtaking the caterpillar. It is so weakened, however, that it cannot maintain an erect position and bends over sometimes at right angles with the trunk and sometimes lower still. In the case of very considerable weakening the shoot may eventually break off by reason of its own weight but in other instances, once the caterpillar disappears, the natural vigour of the tree enables it to set about repairing the injury. The wound heals and the point of the shoot turns upwards. Instead, however, of turning upwards at right angles in a new vertical plane it takes a distinct curve until it is approximately over the centre of the lower part of the trunk, then by a sharp turn quickly assumes a vertical position. This all occurs in the course of a few weeks and probably passes unnoticed. The curve, however, develops with the growth of the tree and becomes very noticeable a few years later. As time goes on there is a distinct tendency for deformed trunks to straighten, for growth is much more rapid on the inside than on the outside of a curve. Numerous deformed trunks are doubtless removed in the course of thinning, but some probably remain until the crop is mature and this may be one of the reasons for irregularities of structure that are sometimes found in planks.

It has been suggested that the curve in the trunk is due to the removal of the natural leader and by a side branch turning upwards to take its place. There is, however, plenty of evidence to prove that in healthy young pines which lose their leaders, there is a distinct tendency for not one but a number of side branches to turn upwards at a sharp angle and in some cases it becomes necessary to thin them out in order to preserve a single trunk. Moreover, the curve often occurs midway along the annual growth, a point at which it would be very unlikely that a side shoot would appear. In order to make sure that there had been no interruption in the original leading shoot of the specimens in question, a longitudinal section was cut through a curved trunk from a point six inches below the curve to a similar distance above. The pith was then traced and found to be continuous, but at the lower bend it had been injured to some extent. A whorl of branches occurred at the lower bend and the next whorl was immediately above the higher bend. The lower part of the trunk had 14 annual rings and the upper part 12 annual rings.

The accompanying photographs show the outer and inner surfaces of one of the sections.

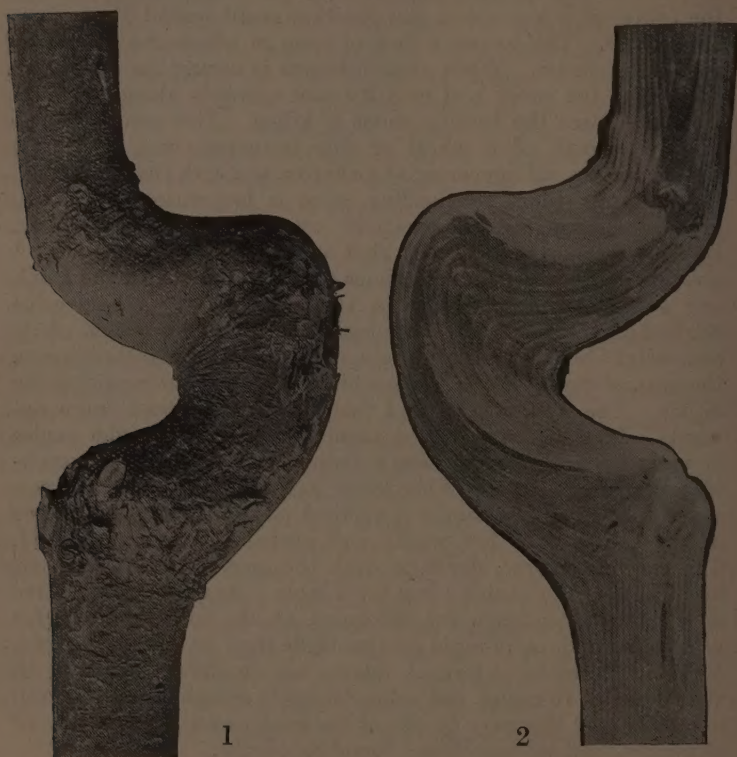


Fig. 1. External view of a curved stem of *Pinus sylvestris*.

Fig. 2. Internal view of the same stem.

A single attack by this moth is capable of causing considerable injury to a tree and repeated attacks effectually prevent normal development, the head assuming a bushy, stunted character. Several such trees are to be seen at Kew, notably *Pinus muricata*. Many species of *Pinus* are attacked, even those introduced recently from China. The five-leaved pines, however, appear to be less susceptible to attack than the two- and three-leaved kinds. From Mr. Gamble we have received injured trunks of *P. sylvestris*, *P. Pinaster*, *P. radiata*, and *P. montana* var.

An illustration of a curved pine stem following an attack by *Retinia buoliana* is given by A. Barbey in *Traité d'Entomologie Forestière* (1913), p. 235.

An article on the injury to young woods by this moth, written by Mr. W. P. Greenfield, appeared in the *Quarterly Journal of Forestry* for January, 1914, pp. 25-30.

W. D.

The Royal Botanic Gardens, Ceylon.—To mark the centenary of the Royal Botanic Gardens, Peradeniya, which falls this year, a brochure tracing its history and illustrating the many-sided activities of the Institution has been published as the joint work of Mr. Stockdale, Director of Agriculture, Mr. Petch, Botanist and Mycologist, and Mr. Macmillan, Superintendent of Botanic Gardens. The review is grouped under six sections, the first three dealing chiefly with the history and development of the Gardens and its various branches, the last three summarising the botanical and agricultural work carried out.

In the first section, which is headed "History," it is recorded that the Royal Botanic Gardens, Ceylon, like other well-known tropical stations, was not originally established on the site where it is found to-day. The dates of founding the first garden are suggested as 1810, 1811, and 1812, the latter date being the one most favoured. The site too is a matter for conjecture and there were probably two stations, Caltura Garden and the Garden at Colombo until in 1821 when a site, selected by Alexander Moon at Peradeniya, was finally approved and the Botanic Garden instituted there in 1822, where it now covers an area of 147 acres.

During the first period attention was chiefly devoted to growing coffee and vegetables, the actual development of the Gardens being considered to date from the appointment of George Gardner in 1844. "Landscape Development and Acclimatisation" is dealt with in the second section, where the gradual evolution of the Garden is traced and a record of the construction of the principal features given. The main outline of the Garden was traced by Thwaites who was in charge first as Superintendent and later as the first Director from 1849 to 1880, and this work was completed by Trimen, the second Director, from 1880–1896.

The third section deals with the "Establishment of Branch Gardens." In all five branch gardens have been established in different climatic zones of Ceylon, but only two—Hakgala and Henaratgoda—are still retained under the Department. Henaratgoda Garden has the distinction of having been opened for the accommodation of the then recently introduced rubber plants from South America, and the original plantation of *Hevea brasiliensis* is still to be seen there. A brief account of the various attempts to introduce plants raised at Kew from South American seed is given, and the success that attended a consignment of nearly 2000 seedlings which had been raised at Kew and sent to Ceylon in 1876 marked the establishment of Para rubber in the East.

The section dealing with "Botanical Research" is perhaps the most interesting. Many well-known names are here recorded with reference to work carried out at Peradeniya. The most noteworthy feature of the early period of Ceylon botany was Linnaeus' work published in 1747 as the "Flora Zeylanica,"

which constitutes one of the earliest floras based on the Linnean system and written by Linnaeus himself.

This was followed later by Thwaites' work and Trimen's "Handbook of the Flora of Ceylon," which enabled Ceylon to possess at the close of the last century a more complete knowledge of its flora than any other tropical country. Later workers were able to avail themselves of the laboratory and quarters specially constructed for the use of visitors, amongst whom are many names well known in the botanical world.

The section on "Economic Botany and Agriculture" treats with the experiments of such economic crops as coffee, which as an industry was ruined by *Hemileia* in 1880—cinchona, cocoa, tea, rubber, spices, camphor, and most recently sisal and oil palm. The success attendant on the introduction and acclimatisation of these plants as established in Ceylon is traced individually.

The last section deals with the latest phase in the development of a Department of Agriculture from the original Botanic Gardens, and concludes with a complete list of Staff Officers associated with Peradeniya since its commencement.

The history of the development of the Gardens traced in this interesting review gives an excellent idea of the establishment and shows clearly the value of a Botanic Garden. This record of one of the Empire's most famous Botanic Gardens may well be summed up in the concluding words of the authors, "Paradeniya may look back to its past with pride and forward to its future with confidence."